

Supplemental Material

**Relationships of Polychlorinated Biphenyls and
Dichlorodiphenyldichloroethylene (*p,p'*-DDE) with
Testosterone Levels in Adolescent Males**

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Methods

Analyses of the PCBs and organochlorines

The analytical reproducibility of the method for PCB analysis is fully described and discussed in the DeCaprio et al. (2000) and (2005) papers. In general, the %RSD (relative standard deviation) for all congeners was < 20%, with most < 15%, which is acceptable for ultra-trace determinations.

Correlations of the different toxicants were determined by bivariate analysis (Supplemental Table S1). As expected, the different PCB congener groups were highly intercorrelated reflecting the inclusion of many of the same congeners. The non-persistent and the estrogenic PCB variables were less strongly correlated with other PCB variables. Correlations of PCBs with *p,p'*-DDE were far lower. Of the PCB groups only the persistent group was correlated with HCB and the persistent group also was the PCB group most highly correlated with *p,p'*-DDE. Lead was not correlated with any of the PCB variables or with *p,p'*-DDE or HCB (results not shown).

References

- DeCaprio AP, Tarbell AM, Bott A, Wagemaker DL, Williams RL, O'Hehir CM. 2000. Routine analysis of 101 polychlorinated biphenyl congeners in human serum by parallel dual-column gas chromatography with electron capture detection. *J Anal Toxicol* 24:403-420.
- DeCaprio AP, Johnson GW, Tarbell AM, Carpenter DO, Chiarenzelli JR, Morse GS, et al. 2005. Polychlorinated biphenyl (PCB) exposure assessment by multivariate statistical analysis of serum congener profiles in an adult Native American population. *Environ Res* 98:284-302.

Supplemental Material, Table S1. Correlations of toxicants.

| | Σ16PCBs | Σ8PerPCBs | Σ6NonPerPCBs | Σ7 Estrogenic PCBs | Anti- estrogenic PCB | Σ4MOPCBs | Σ8DOPCBs | Σ3TTOPCBs | p,p'-DDE | HCB | Pb (μg/dL) |
|----------------------------|----------------------------------|------------------------------------|---------------------------------------|---|-------------------------------------|-----------------------------------|-----------------------------------|------------------------------------|------------------------------|------------|--------------------------------------|
| Σ 16PCBs | - | 0.94** | 0.81** | 0.97** | 0.53** | 0.88** | 0.98** | 0.88** | 0.43** | 0.14 | 0.05 |
| Σ 8PerPCBs | 0.94** | - | 0.57** | 0.87** | 0.48** | 0.83** | 0.94** | 0.77** | 0.56** | 0.20* | 0.03 |
| Σ 6NonPerPCBs | 0.81** | 0.57** | - | 0.86** | 0.48** | 0.70** | 0.78** | 0.82** | 0.07 | 0.02 | 0.10 |
| Σ 7 Estrogenic PCBs | 0.97** | 0.87** | 0.86** | - | 0.46** | 0.81** | 0.97** | 0.86** | 0.34** | 0.12 | 0.07 |
| Anti-estrogenic PCB | 0.53** | 0.48** | 0.48** | 0.46** | - | 0.67** | 0.44** | 0.51** | 0.06 | -0.05 | 0.16 |
| Σ 4MOPCBs | 0.88** | 0.83** | 0.70** | 0.81** | 0.67** | - | 0.79** | 0.81** | 0.40** | 0.06 | 0.03 |
| Σ 8DOPCBs | 0.98** | 0.94** | 0.78** | 0.97** | 0.44** | 0.79** | - | 0.84** | 0.44** | 0.17 | 0.04 |
| Σ 3TTOPCBs | 0.88** | 0.77** | 0.82** | 0.86** | 0.51** | 0.81** | 0.84** | - | 0.29** | 0.09 | 0.11 |
| p,p' -DDE | 0.43** | 0.56** | 0.07 | 0.34** | 0.06 | 0.40** | 0.44** | 0.29** | - | 0.41** | -0.05 |
| HCB | 0.14 | 0.20* | 0.02 | 0.12 | -0.05 | 0.06 | 0.17 | 0.09 | 0.41** | - | 0.13 |
| Pb (μ g/dL) | 0.05 | 0.03 | 0.10 | 0.07 | 0.16 | 0.03 | 0.04 | 0.11 | -0.05 | 0.13 | - |

All organochlorines are measured in ppb. ** $p \leq 0.0001$; * $p \leq 0.05$.

Supplemental Material, Table S2. Predictors of testosterone levels in adolescent males: Results of the multivariate regression analysis (n = 120; R² = 71%).

| Covariate | β (95% CIs) | p |
|------------------------------------|----------------------|---------|
| Tanner Stages I & II vs. III | -1.84 (-2.41, -1.27) | < 0.001 |
| Tanner Stages IV & V vs. III | 1.19 (0.60, 1.79) | < 0.001 |
| Height-for-age z-score | -0.08 (-0.27, 0.12) | 0.44 |
| Weight-for-age z-score | 0.06 (-0.12, 0.24) | 0.53 |
| Breastfeeding (y/n) | 0.01 (-0.41, 0.44) | 0.95 |
| Childs Alcohol Use (y/n) | 0.58 (-0.29, 1.45) | 0.19 |
| Childs Cigarette Use (y/n) | 0.53 (-0.22, 1.27) | 0.17 |
| Cholesterol (mg/dL) | -0.01 (-0.01, 0.00) | 0.18 |
| Triglycerides (mg/dL) | < 0.01 (-0.01, 0.01) | 0.92 |
| Pb (μ g/dL) | -0.05 (-0.22, 0.11) | 0.55 |
| p,p'-DDE (ppb) | 0.52 (-0.05, 1.09) | 0.07 |
| HCB (ppb) | 0.05 (-0.48, 0.58) | 0.85 |
| Σ 16PCBs (ppb) ^b | -0.56 (-1.08, -0.05) | 0.03 |

^aTestosterone, cholesterol, triglycerides, lead, p,p'-DDE, HCB and PCB variables are ln-transformed. ^bCongeners with \geq 50% detection rate; Sum of IUPAC#s 52, 70, 74, 84, 87, 95, 99, 101[+90], 105, 110, 118, 138[+163+164], 149[+123], 153, 180, 187. Bracket indicates 'minor' coeluting congener based on Aroclor concentration (Hansen, 1999). Values < MDL were imputed from the estimated distribution < MDL.